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July 12, 2004

FILED ELECTRONICALLY

Ms. D'Wana Terry
Chief, Public Safety and Critical
Infrastructure Division
Wireless Bureau
Federal Communications Commission
445 12th St. SW
Washington DC 20554

Re: **EX PARTE** in Reconsideration of the Memorandum Opinion and Order and Third Report and Order in The 4.9 GHz Band Transferred from Federal Government Use, WT Docket No. 00-32

Dear Ms.Terry:

At our ex parte meeting of July 1, 2004, you requested additional information from the National Public Safety Telecommunications Council (NPSTC), Cisco Systems, Inc., Tropos Networks, Nortel Networks, and Packethop, Inc. (hereinafter the "4.9 GHz Open Standards Coalition"). Since our meeting, Bermai, Inc. has also decided to join the 4.9 GHz Open Standards Coalition. This letter provides our collective response to the questions regarding mobile broadband communications and the supporting infrastructure raised at that meeting, including: (1) further elucidation of the practical consequences in the selection of a mask for this band; (2) how we expect the band to be used; and (3) how our proposal to proceed with experimental licenses above 20 dBm will meet the needs of Public Safety and evolve to future Commission policy.

The 4.9 GHz Open Standards Coalition shares the FCC's goal to enable the robust operation of high speed broadband data communications for Public Safety. We are confident that commercial off the shelf 802.11 technology can deliver, and even exceed, your expectations for one simple reason – the technology is already emerging as the system of choice for public safety agencies across the country, regardless of the agency's size, mission, or geography.

In addition, 802.11 technology is already designed to ensure that packet transmissions are successful. For example, 802.11 devices "listen-before-talk" – the devices first determine if a frequency is in use before transmitting packets. Second, these devices are equipped with the ability to select a clear channel. Third, transmit power

control promotes frequency reuse by causing the devices to operate at appropriate power levels. Fourth, transmission of packets occurs in "bursts" – these devices typically have duty cycles of about 10 per cent. When packet collisions do occur, the devices will retransmit packets. All of this technology was developed to make 802.11 robust in an unlicensed environment where the devices must accept interference and not cause interference to primary spectrum users. This same functionality, that has been so successful commercially, will assist Public Safety in serving its mission, provided the FCC makes the right choices in this reconsideration.

1. Mask selection

Selection of DSRC Mask A is the optimal choice for the 4.9 GHz band for rms power levels 20dBm and below as the shape of the mask will not result in disruptive adjacent channel interference. As we will discuss below, in the unlikely event that two devices, physically co-located, are transmitting simultaneously on adjacent channels, one device will temporarily delay, or resend, data packets that will slow the data rate to the laptop or handheld. Instead of data rates in the 5-20 megabit/sec range, data rates will still be at several megabits/sec, many multiples higher than data rates used today by Public Safety in other bands (e.g., 19.2 kilobits/sec). This result is very different from analog voice transmissions in other public safety bands, where interference can result in the inability of the system to communicate voice transmissions successfully. *Moreover, not even critical voice communication systems in use today are engineered to complete 100 per cent of all voice transmissions.*

Based on our analysis, selection of Mask A is associated with several strong, positive benefits for Public Safety. The negative trade-offs in the selection of Mask A are relatively minor. The opposite is true for Mask C. Selection of Mask C is associated with strong negative attributes, offset only by relatively unimportant benefits. Our findings are summarized below.

About Mask A. Mask A is associated with several strong positive benefits. Because Mask A is currently used by a large, growing, and worldwide 802.11 market at 2.4 and 5 GHz, the mask leverages this robust, competitive market to the benefit of public safety in several significant respects:

- Ongoing innovations (e.g., for quality of service, security, etc.)
- Open standards, interoperability, and a large supplier community
- Competitive pricing
- Rapid availability of product at 4.9 GHz
- Off the shelf availability

The negative trade-offs in the selection of Mask A are minor. The probability of two or more co-located Access Points transmitting in adjacent channels is very low and can be administratively managed by the incident commander. If such a situation arises, the incident commander would simply need to relocate the Access Points or antenna

using the adjacent channels at an additional distance of about 30 feet further away than would be the case using Mask C, which is not a significant factor.

About Mask C. In contrast to Mask A, Mask C offers less important benefits. Advocates of the mask argue that it will result in less interference than Mask A, but this statement fails to capture the very limited, highly unusual settings in which such interference would occur. Simply put, two or more Access Points transmitting in adjacent channels are highly unlikely to operate in a single incident management scene. If the unlikely need arises to deploy two or more Access Points that are simultaneously transmitting in adjacent channels, the physical locations of those Access Points can easily be managed by the incident commander. The benefit of Mask C is only that Access Points using it can be placed about 30 feet closer together than when using Mask A – an insignificant difference.

Furthermore, the real world probability of two or more unrelated incidents occurring in virtually the same geographic location is very low and hence the possibility of Access Points deployed in adjacent channels is extremely remote. Commercial 802.11 systems use carrier sense-based medium access (CSMA) to manage interference. This interference management technique simply results in packet transmissions being temporarily delayed for milliseconds, not significantly affecting the applications and unnoticeable to the user.

The insignificant benefit Mask C offers relative to Mask A can be further analyzed with reference to the significant negative effects that Mask C presents. First, Mask C requires 802.11 manufacturers to make additional and costly design changes to develop power amplifiers with linear qualities. Such linear power amplifiers will increase power consumption resulting in significantly reduced battery life and excessive heat in portable devices. Second, by not using the same commercial mask across all frequencies, Public Safety will not be able to utilize a single system to access the 5 GHz frequencies as an additional "reservoir" of bandwidth to complement and extend 4.9 GHz frequencies in the event those become occupied, for non-mission critical applications such as field reporting.

Third, by requiring a different mask at 4.9 GHz than at the 5 GHz bands, the Commission's rules will effectively create a niche market for 4.9 GHz devices that 802.11 manufacturers will likely ignore. Manufacturers will remain focused on the broader, worldwide market for 802.11 devices using Mask A. The additional cost of designing and producing a different product for 4.9 GHz will establish a significant commercial hurdle to participating in the 4.9 GHz market. Finally, niche markets – like the kind that would be created by requiring Mask C – are typically vertically integrated with one supplier. By not choosing Mask A, the Commission will cause Public Safety to miss out on the continuous advancements in networking and applications that are the hallmarks of the standards-based 802.11 industry.

We also wish to note that the choice of mask is irrelevant with respect to two fundamental characteristics – both masks enable a fixed reuse pattern (cells) and there are no differences with respect to out of band emissions.

2. Use of the band

Public safety has never before had spectrum dedicated for its use that is suitable for wireless broadband data transmissions. As a result, many of the uses to which this band will be applied will be invented as the Public Safety community learns the capabilities of the technology and develops applications to serve its needs. However, 802.11 wireless broadband services have been available to enterprise customers for many years, and are extremely successful in the market. From this experience, and from the emerging experience that Public Safety agencies have had utilizing systems at 2.4 GHz, it is likely that early uses will involve mobile multimedia applications such as access to information stored on databases located at police or fire headquarters, interactive messaging, and real-time video distribution during incidents.

For example, police departments will want to access records of outstanding warrants or arrest records, mug shots, fingerprint information, photographs and other data about missing persons, general Internet access, online reporting to local, state, and federal databases, and data that control traffic signals, as well as video from traffic cameras or other cameras. For fire departments, likely information would include information on the location of reported fires, hydrant locations, hazardous materials housed in a particular building, photographs or "blueprints" of buildings, information on building ventilation systems, and remote monitoring of firefighters' vital signs and locations on a fire scene. In addition, public safety agencies may wish to equip their vehicles with video cameras that will allow remote monitoring of smaller incidents to which a command vehicle would not be dispatched. Further information on how such systems might be utilized can be found at http://www.dhs.gov/interweb/assetlibrary/NIMS-90-web.pdf

All public safety agencies utilizing wireless broadband will benefit from administrative management by mobile incident command vehicles**.** Regardless of the Commission's decisions on the mask issue, public safety incidents will each be controlled by an incident commander – either on scene or remotely. That incident commander will have the authority to position mobile Access Points and to direct use of specific frequencies should the need arise. This is unlike the unlicensed use of spectrum, where any user has the right to utilize an unlicensed Part 15 device without regard to other users. As a result, it provides an additional measure of security against interference concerns.

3. Experimental licenses above 20 dBm RMS power

The vendor community and NPSTC are highly confident that no harmful interference will occur using Mask A for 4.9 GHz public safety communications. At 20 dBm rms power and below, our degree of confidence is so high that we recommend immediate adoption of Mask A.

Above 20 dBm rms power, experimental licenses can be used to confirm that Mask A will be sufficient to guard against interference. In addition, experimental licenses will be the best way to learn whether other engineering choices in the design of the devices might prove to be a better approach in guarding against interference at higher power – such as improved receiver or antenna technology. Based on this real world experience, the FCC can better inform itself of what rules would be appropriate for power levels above 20 dBm rms power.

Conclusion

The vendor community and NPSTC desire to have the opportunity to apply 802.11 technology and systems to the public safety market in the 4.9 GHz band. Our proposal to allow Mask A at or below 20 dBm RMS power, while providing for experimental licenses above 20 dBm, gives the Commission a way to bring this reconsideration to prompt conclusion, while allowing technology to continue to evolve. Because many municipalities are releasing requests for proposal, we are requesting prompt action, and look forward to working with you to bring this debate to a successful conclusion.

Sincerely,

THE 4.9 GHZ OPEN STANDARDS COALITION

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